



ECONOMY AND ENVIRONMENT PROGRAM FOR SOUTHEAST ASIA

POLICY BRIEF

SEWAGE OR SWIMMING? THE RECREATIONAL VALUE OF EAST LAKE, WUHAN, CHINA

Demand for swimming, fishing and boating could provide an economic rationale for the clean-up of one of China's most famous lakes, according to a recent study undertaken by a leading Chinese environmental economist.

The study, carried out by Ms. Du Yaping with a team of postgraduate students from the Institute of Economics at the Hubei Academy of Social Sciences, looked at how demand for water-based recreation at East Lake, Wuhan, would change if the level of pollution in the lake's waters improved. The researchers found that cleaning the lake could raise its recreation value by up to 50%, and suggested that the cost of clean-up might be re-couped by charging appropriate fees to the visitors attracted by the new recreation possibilities.

The East Lake study site is a famous recreational area. Set within the metropolitan boundary of Wuhan, it is well known for its vast water area, natural tranquility and beauty. However, since the late 1950's, when the lake was cut off from the Yangtze river, more and more domestic and industrial waste has entered its waters, the quality of which has steadily deteriorated. In the 1950s the lake water was clear, but now most parts of the lake are eutrophicated and visitors are greeted with the sight and smell of algae and murky water.

Deteriorating water quality coupled with health scares amongst users led to the closure of several popular swimming sites in the 1980s, the loss of many fishing areas and a decline in the number of visitors. Indeed, since the 1960s, one-third of the recreational opportunities of the lake has been lost to pollution. In

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recent years there have been appeals in the media for action against pollution. Although several plans have been made, their implementation has been limited by lack of funds for investment and maintenance. This made an economic assessment of the benefits of a cleaner lake particularly pressing.

While economists have well-developed tools for determining the value of goods which are bought and sold, the procedures for working out the value of goods which are not marketable - such as clean lake water - are the subject of some controversy. The East Lake study involved a detailed socio-economic survey of over 500 lake users followed by a detailed multiple-stage analysis - using two non-market valuation methods, namely travel cost and contingent valuation - to come to grips with the problem.

In order to see whether the right questions were asked and appropriate information gathered, a pilot sampling was undertaken and two seminars were held to scrutinize the design and procedure. Initial responses underlined the seriousness of the problem. Less than 5% of visitors considered that the water quality in the lake was good. In contrast nearly 60% believed it to be bad or very bad.

Despite the fact that the lake was felt to be badly polluted, the study found that many people still visit East Lake from all over Wuhan province and from the provinces surrounding it. Some come from even farther afield. The fact that people are willing to invest time and money to visit the area to use the lake shows that they value it for recreation. By working out how much this travel costs - both in terms of transport and time taken - the researchers were able to gauge demand for lake use.

The researchers also asked people how much more frequently they would visit the lake if the water quality improved - from its present state to either boatable, swimmable or drinkable levels. From this, they were able to extrapolate how demand would increase if the lake were cleaned up.

Using this travel cost method, the researchers found that the value of the lake to those who use it was already high. In its present condition they calculated the unit value of the lake area (73 square kilometers) to be between CNY 26.6/m² and CNY 66.6/m² - some 10-30 times the compulsory purchase price of agricultural land for non-agricultural use and higher than the commercial land price in small and medium cities (though not as high as in Wuhan).

Confirming their hypothesis that improvement of water quality would lead to a higher demand for recreation in the lake, the researchers found that improving the water quality to swimmable quality and drinkable level could increase the unit value of the lake by CNY 18.09/m² and CNY 32.13/m² respectively.



In order to cross-check these findings, the researchers asked visitors how much money they would be willing to pay for improvements in water quality and asked them why they would do so. Using this contingent valuation method, the researchers then extrapolated how much all the people who use the lake would be willing to pay for different levels of clean-up: again giving a value to water quality. They found that the values, while somewhat larger than those they had calculated by assessing recreation-use demand, broadly reinforced their findings that the economic importance of the lake went up as its water became cleaner.

The disparity in value reflects the fact that the contingent valuation method can include non-use values, while the travel cost method does. Of those asked about their willingness to pay for water clean-up, 40% said they would pay because of a sense of social responsibility, and about 16% were willing to pay for the benefit of future generations. Clearly, the existence of the lake with better water quality is valued by many for reasons beyond recreational use.

Given the economic value of cleaning East Lake, the study recommended that water pollution treatment should be taken to clean the lake, but that, given the significant increase in consumer demand for 'swimmable' levels of clean-up, it may not be worthwhile to pursue attainment of the highest drinkable quality level.

Furthermore, measures must be taken to discourage free riders and elicit payment for better quality. The researchers noted that it is probably impractical to collect such payment through local taxation or donations, but that they could be collected without excessive administrative cost through fees for entry, angling or swimming.

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Note: 8.28 CNY = 1 USD

The full text of this study is available as an EEPSEA Research Report:
*The Value of Improved Water Quality for Recreation in East Lake, Wuhan, China:
Application of Contingent Valuation & Travel Cost Methods* - Du Yaping

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